

Lot 5 Fox-Miller Property

2010 Annual Report

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Prepared for:
H.G. Fenton Company
7577 Mission Valley Road
Suite 200
San Diego, CA 92108

Prepared by:
HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard, Suite 200
La Mesa, CA 91942

**LOT 5 FOX-MILLER PROPERTY
2010 ANNUAL REPORT**

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.0	INTRODUCTION	1
1.1	Project Location	1
1.2	Mitigation Requirements	1
1.3	Installation	2
2.0	METHODS	3
2.1	Maintenance	3
2.2	Maintenance Monitoring	4
2.3	Annual Technical Monitoring	4
3.0	SUCCESS CRITERIA.....	5
3.1	Thread-Leaved Brodiaea	6
3.2	Diegan Coastal Sage Scrub	6
3.3	Native Grassland	7
3.4	Southern Willow Scrub	8
4.0	RESULTS..	8
4.1	Maintenance	8
4.2	Maintenance Monitoring	9
4.2.1	Thread-leaved Brodiaea.....	9
4.2.2	Diegan Coastal Sage Scrub.....	9
4.2.3	Native Grassland.....	9
4.2.4	Southern Willow Scrub.....	10
4.2.5	Open Space Areas	10
4.3	Annual Technical Monitoring	10
4.3.1	Thread-leaved Brodiaea.....	10
4.3.2	Diegan Coastal Sage Scrub.....	12
4.3.3	Native Grassland.....	14
4.3.4	Southern Willow Scrub.....	17
5.0	DISCUSSION	17
6.0	RECOMMENDATIONS	20
7.0	REFERENCES	21

TABLE OF CONTENTS (cont.)

LIST OF APPENDICES

<u>Letter</u>	<u>Title</u>
A	Representative Photographs
B	Plant Species Observed
C	Animal Species Observed within the Various Restoration Areas

LIST OF FIGURES

<u>Number</u>	<u>Title</u>	<u>Follows Page</u>
1	Regional Location Map.....	2
2	Project Location Map.....	2
3	Restoration Areas.....	2
4	Transect and Plot Locations.....	6
5a	Quantity and Distribution of Flowering Thread-leaved Brodiaea Individuals – Translocation Plot.....	10
5b	Quantity and Distribution of Flowering Thread-leaved Brodiaea Individuals – Reference Plot A.....	10
5c	Quantity and Distribution of Flowering Thread-leaved Brodiaea Individuals – Reference Plot B.....	10
5d	Quantity and Distribution of Flowering Thread-leaved Brodiaea Individuals – Reference Plot C.....	10
5e	Quantity and Distribution of Flowering Thread-leaved Brodiaea Individuals – Reference Plot D.....	10
5f	Quantity and Distribution of Flowering Thread-leaved Brodiaea Individuals – Reference Plot E.....	10
6	Native Grass Planting Areas within Native Grassland Restoration Area.....	18

LIST OF GRAPHS

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Total Number of Flowering Thread-leaved Brodiaea Individuals per Plot.....	11
2	Number of Flowering Thread-leaved Brodiaea Individuals per Plot over Time.....	12
3	Species Richness in Diegan Coastal Sage Scrub Restoration Area.....	13
4	Percent Vegetation Cover in Diegan Coastal Sage Scrub Restoration Area.....	14
5	Species Richness in Native Grassland Restoration Area.....	16
6	Percent Vegetation Cover in Native Grassland Restoration Area.....	16

TABLE OF CONTENTS (cont.)

LIST OF TABLES

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Installation Summary	2
2	2010 Site Visits	4
3	Diegan Coastal Sage Scrub Success Criteria Milestones	7
4	Native Grassland Success Criteria Milestones	7
5	Southern Willow Scrub Success Criteria Milestones	8
6	Year 4 Results for the Diegan Coastal Sage Scrub Restoration Area.....	12
7	Year 4 Results for the Native Grassland Restoration Area.....	15
8	Year 4 Results for the Southern Willow Scrub Restoration Area	17

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1.0 INTRODUCTION

This annual report summarizes the 2010 biological monitoring during the fourth year of restoration of the Lot 5 Fox-Miller project located in Carlsbad, California. This report was prepared in compliance with monitoring program requirements described in the project's Habitat Restoration and Mitigation Plan (Restoration Plan; RECON 2005).

1.1 PROJECT LOCATION

The restoration project is located north of Palomar Airport Road, east of El Camino Real, and between Faraday Avenue and College Boulevard in the City of Carlsbad, California (Figures 1 and 2). Habitat restoration is occurring within a 7.44-acre portion of an on-site preserve area.

1.2 MITIGATION REQUIREMENTS

Project impacts to approximately 2.66 acres of Diegan coastal sage scrub (DCSS) were mitigated at a 2:1 ratio, which included on-site preservation of 2.9 acres, on-site restoration/conversion of 1.80 acres of non-native grassland to DCSS, and on-site revegetation of 0.62 acre of DCSS on manufactured slopes. A total of 2.42 acres of DCSS restoration is occurring on site.

Impacts to 0.36 acre of native grassland (NG) were mitigated at a 3:1 ratio, which included on-site preservation of 0.07 acre of NG and on-site restoration/conversion of 1.01 acres of non-native grassland to NG. Impacts to 30.23 acres of non-native grassland were mitigated at a 0.5:1 ratio, which included on-site preservation of 11.41 acres of non-native grassland and restoration/conversion of 3.71 acres of non-native grassland to NG. A total of 4.72 acres of non-native grassland are being restored/converted to NG.

Impacts to 0.11 acre of thread-leaved brodiaea (*Brodiaea filifolia*) habitat were mitigated through on-site preservation of approximately 95 percent (2.05 acres) of the thread-leaved brodiaea population and translocation of the remaining 5 percent (0.11 acre) of the population from areas that would be impacted to the NG restoration area on site.

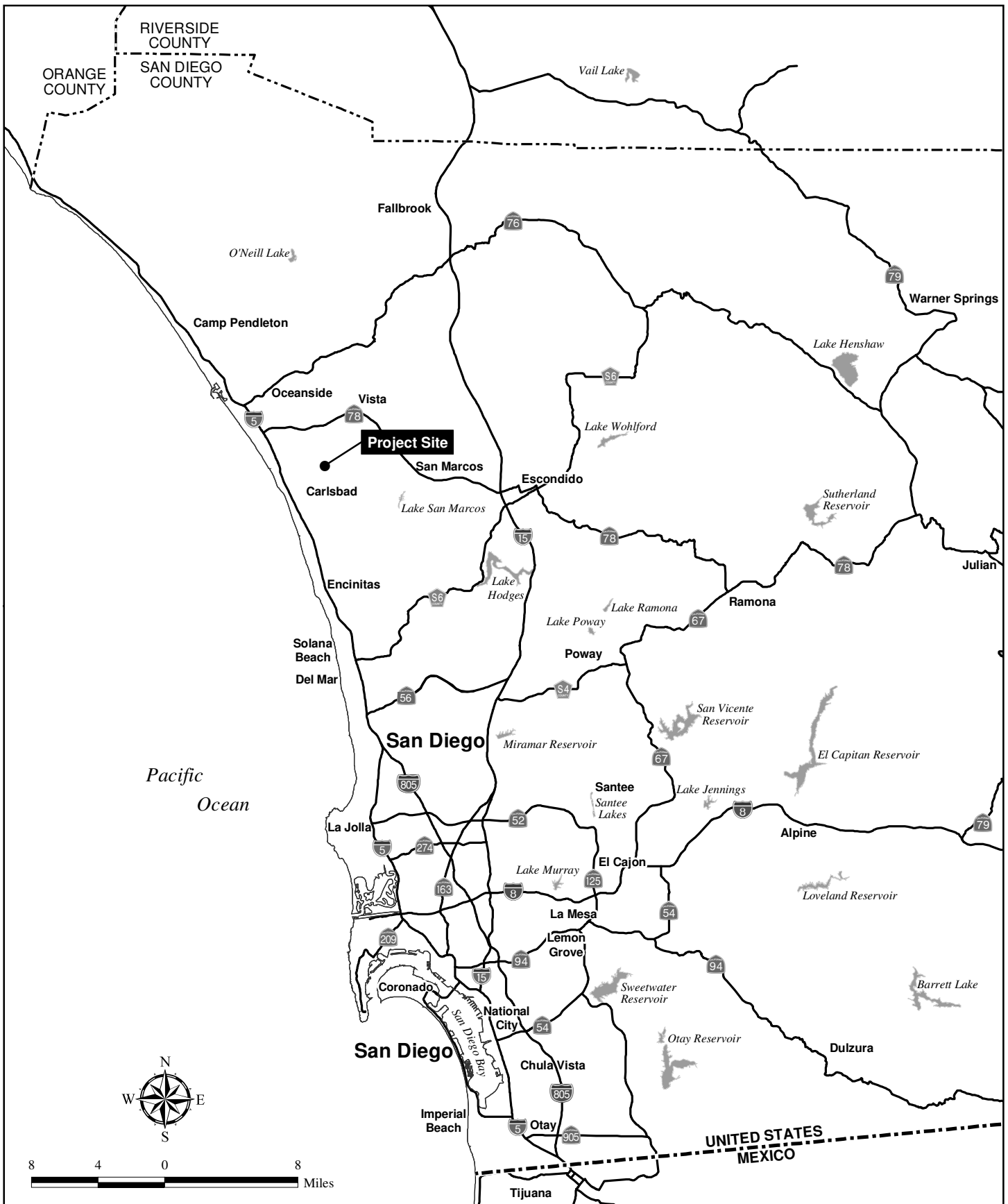
The project impacted 0.22 acre of habitat under the jurisdiction of U.S. Army Corps of Engineers (Corps) and California Department of Fish and Game (CDFG) jurisdictional waters. Impacts to 0.03 acre of disturbed wetland habitat (i.e., tamarisk scrub) were mitigated at a 2:1 ratio and impacts to 0.19 acre of non-wetland Waters of the U.S./streambed habitat were mitigated at a 1:1 ratio. Mitigation requirements include purchase of 0.22 acre of wetland mitigation credits from the off-site Pilgrim Creek Mitigation Bank and on-site creation of 0.30 acre of southern willow scrub (SWS) habitat, in accordance with the Corps Nationwide Permit (Permit # 200301550-SMJ), the Regional Water Quality Control Board's 401 Certification (File # 04C-028), and the CDFG's Streambed Alteration Agreement (# 1600-2004-0084-R5). The SWS creation area on site is approximately 0.27 acre, which is smaller than the 0.30-acre area listed in the permits, but does fulfill the mitigation ratio requirements for jurisdictional impacts.

1.3 INSTALLATION

Thread-leaved brodiaea located in the project footprint were salvaged in 2006 using the cut-block method (Table 1; RECON 2008). The SWS creation area (Figure 3) was installed in February 2007 (Table 1; RECON 2007a). The DCSS, NG, and SWS restoration areas (Figure 3) were installed in spring 2007 (Table 1; RECON 2007b). A summary of the installation is provided in Table 1.

Supplemental installation during the current year included installation of container stock in the DCSS restoration area, and seeding of the NG and DCSS restoration areas (Table 1).

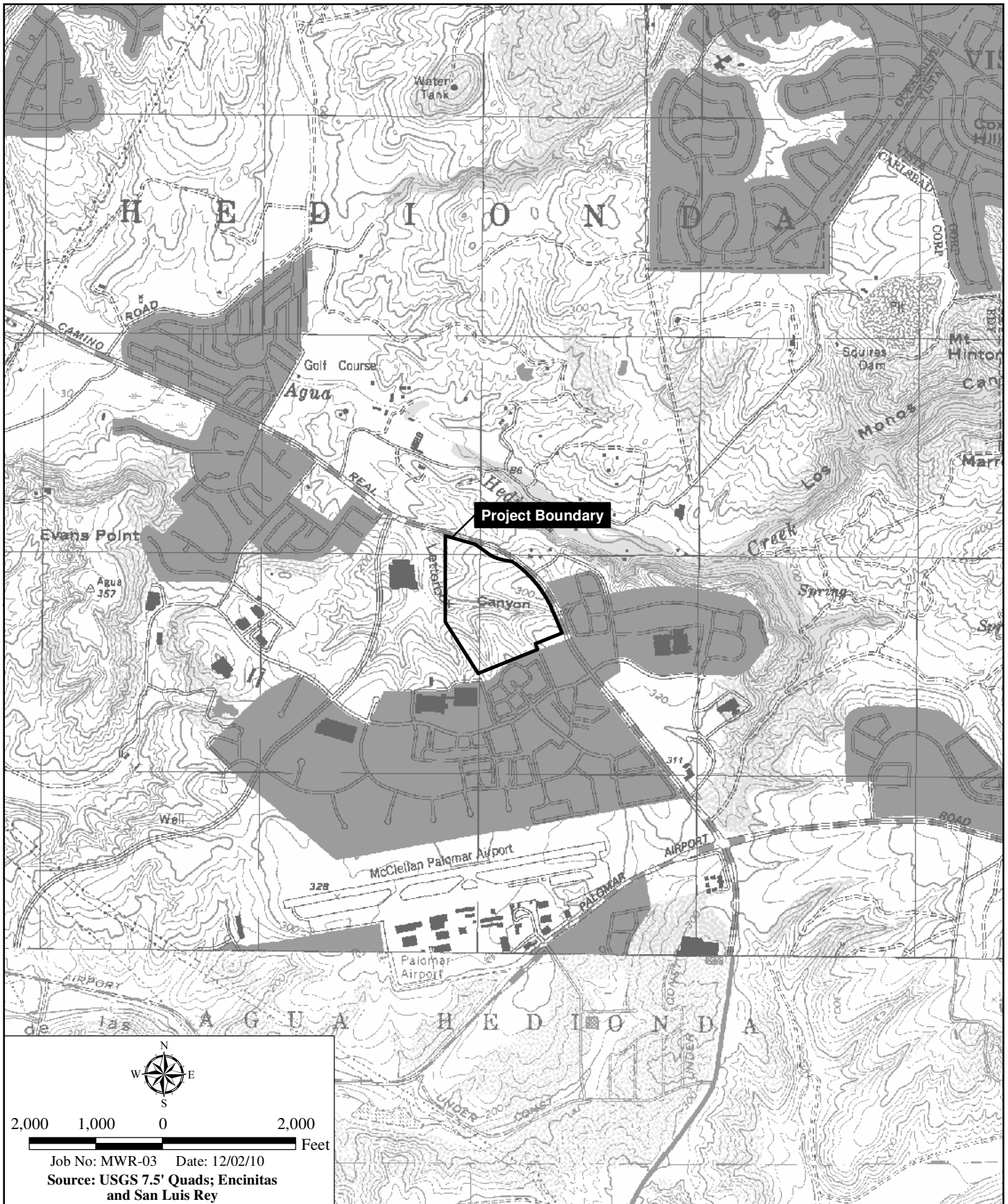
Table 1 INSTALLATION SUMMARY	
Date	Activity
January 2006	Brodiaea salvaged from development footprint (cut-block method).
February 2007	Planting of 0.25-acre SWS creation area was completed.
March 2007	Planting of the 4.72-acre NG restoration area was completed.
April 2007	Planting of the 2.42-acre of DCSS restoration areas were completed.
January 21, 2009	Seeded NG restoration area with a 33.04 lb. mixture consisting of purple needlegrass (<i>Nassella pulchra</i>) and small flowered needlegrass (<i>Nassella lepida</i>).
April 21- May 14, 2009	Planted 1,309 one-gallon container stock in DCSS restoration areas.
May 7, 2009	Irrigation installation completed.
July 15-16, 2009	Seeded DCSS restoration areas with 16.64 lbs of native seed.
July 16, 2009	Seeded SWS restoration area with 3.93 lbs. of native seed.
September 8, 2009	Installed container stock consisting of 30 salt grass (<i>Distichlis spicata</i>), 30 sandbar willow (<i>Salix exigua</i>), and 10 mule flat (<i>Baccharis salicifolia</i>) specimens in the SWS restoration area.
October 9, 2009	Installed container stock consisting of 30 black willow (<i>Salix gooddingii</i>), 30 sandbar willow, and 60 mule flat specimens in the SWS restoration area.
October 9, 2009	Installed container stock consisting of 45 California sagebrush (<i>Artemisia californica</i>), 10 laurel sumac (<i>Malosma lauriana</i>), 30 California encelia (<i>Encelia californica</i>), 5 white sage (<i>Salvia apiana</i>), and 20 black sage (<i>Salvia mellifera</i>) specimens in the DCSS restoration areas.
October 12-16, 2009	Installed container stock consisting of 1,305 purple needlegrass in the NG restoration area.
December 2009	Irrigation shut off.
January 20, 2010	Installed 100 lbs of purple needlegrass in NG restoration area.
January 26, 2010	Installed 105 lbs of purple needlegrass in NG restoration area.



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Regional Location Map

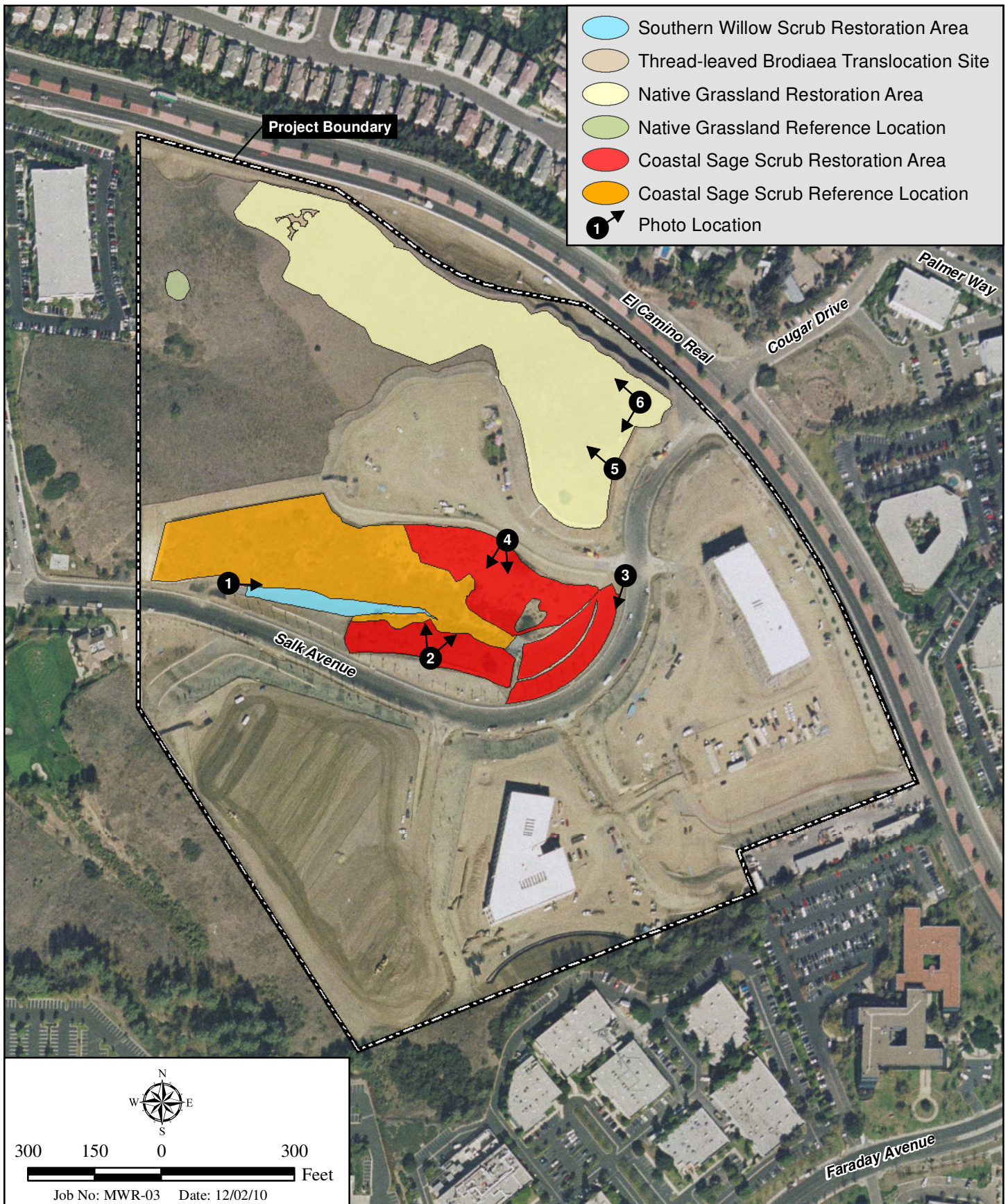
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Project Location Map

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Restoration Areas

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Table 1(cont.) INSTALLATION SUMMARY	
February 16-17, 2010	Installed container stock consisting of 30 California sagebrush, 30 laurel sumac, 20 black sage, and 20 lemonade berry (<i>Rhus integrifolia</i>) in bare portions of the DCSS restoration area.
February 18, 2010	Installed 34.2 lbs of seed in the DCSS restoration area.

2.0 METHODS

Restoration activities during the thread-leaved brodiaea soil salvage, restoration installation, and Year 1 of the 5-year restoration project were completed by RECON. HELIX Environmental Planning, Inc. (HELIX) took over responsibility of monitoring and HELIX Environmental Construction Group (HECG) took over maintenance responsibilities for the project during Year 2 (May 2008).

After installation, the restoration effort consists of (1) site maintenance; (2) regular monitoring to direct maintenance activities; and (3) annual monitoring to assess the progress of the restoration effort toward achieving final mitigation goals. Site maintenance is performed by a maintenance contractor and typically conducted more frequently in the first few years of restoration when non-native plant control is a major issue. Maintenance monitoring relies on visual observations of the site, plant health, etc. It is conducted frequently during the first few years of the restoration effort and less frequently toward the end of the maintenance and monitoring period as the site becomes more established. Annual monitoring consists of visual observations during the first 2 years of restoration, and quantitative measurements during the remainder of the 5-year maintenance and monitoring period. One annual report is produced for each of the 5 years of monitoring.

Nomenclature used in this report follows these conventions: vegetation community classifications follow Holland (1986); plants named in this report were identified according to The Jepson Manual, Higher Plants of California (Hickman 1993); and sensitive species status follows the CDFG (2008) and the U.S. Fish and Wildlife Service (USFWS; 2007).

2.1 MAINTENANCE

HECG performed routine (monthly) maintenance. Work conducted by HECG includes weed management and trash removal, and supplemental planting and/or seeding of the restoration areas. HECG also managed invasive weed species within the open space on site (monthly weeding).

2.2 MAINTENANCE MONITORING

Seven maintenance monitoring visits were conducted by HELIX biologists in 2010 (Table 2). During each visit, a biologist evaluated the site condition and advises maintenance personnel of any items in need of attention.

2.3 ANNUAL TECHNICAL MONITORING

Data collected during the annual monitoring events are used to determine if the project has met success criteria for the given year. For Years 1 and 2, annual monitoring consists of qualitative analysis of overall site conditions, including observations of plant health, observations of plant recruitment (i.e., the successful, natural reproduction and/or establishment of plants in a given area), and general use of the area by wildlife along with photographic documentation of the site. For Years 3 through 5, technical monitoring of the DCSS, NG, and SWS restoration areas consists of a qualitative analysis of overall site conditions and quantitative measurements of species diversity (richness and composition) and vegetative cover using point intercept line and belt-transect sampling methods (described below). Annual monitoring of the thread-leaved brodiaea translocation plot and 5 reference plots consists of quantitative counts of flowering individuals throughout the blooming period.

Table 2 2010 SITE VISITS		
DATE	PERSONNEL	PURPOSE OF VISIT
January 5, 2010	Jason Kurnow	Maintenance monitoring
February 5, 2010	Jason Kurnow	Maintenance monitoring
March 26, 2010	Jason Kurnow	Maintenance monitoring
May 7, 2010	Jason Kurnow Erica Harris	NG/DCSS annual assessment
May 12, 2010	Jason Kurnow Erica Harris	NG/DCSS annual assessment and maintenance monitoring for SWS
May 13, 2010	Jason Kurnow Shelby Howard	On-site meeting with City of Carlsbad, USFWS, and CDFG
May 20, 2010	Jason Kurnow	Thread-leaved brodiaea plot counts
May 28, 2010	Jason Kurnow	Thread-leaved brodiaea plot counts
June 4, 2010	Jason Kurnow	Maintenance monitoring
June 5, 2010	Jason Kurnow	Thread-leaved brodiaea plot counts
June 10, 2010	Jason Kurnow	Thread-leaved brodiaea plot counts
June 19, 2010	Jason Kurnow	Thread-leaved brodiaea plot counts
July 1, 2010	Jason Kurnow	Maintenance monitoring
September 23, 2010	Jason Kurnow	Maintenance monitoring and SWS annual assessment.

Thirteen permanent transects were established during the Year 3 technical monitoring. Vegetation data were collected from 13 line transects: Transects 1 to 6 are located in the DCSS restoration area, Transects 7 to 12 are located in the NG restoration area, and Transect 13 is located in the SWS restoration area (Figure 4). The 2 ends of each line transect were permanently marked with a rebar stake covered with white PVC pipe. Transect lengths are 50 meters (m) and centered on a 50 m by 5 m plot (250 m²), as specified by the California Native Plant Society (1996). Monitoring consisted of point intercept (line transect) sampling methods. At every 50 centimeters (cm) along each transect (beginning at the 50-cm mark and ending at 50 m), a point was projected into the vegetation, and species intercepted by the point were recorded. Vegetation intercepts were categorized into herb (less than 60 cm), shrub (60 to 200 cm), and tree (greater than 200 cm) layers. Total cover is the percentage of points along the transect that are intercepted by vegetation. A single point may be intercepted by plants in multiple layers but would be counted only as a single point for total cover. Percent cover for herb, shrub, and tree categories were calculated for both native and non-native species.

HELIX biologists Jason Kurnow and Erica Harris conducted the 2010 annual assessment for the NG and DCSS restoration areas on May 7 and May 12, 2010. This time period represents the peak time period for detected annual plant species. The SWS annual assessment was conducted by Mr. Kurnow on September 23, 2010 (near the end of the growing season for wetland plants). Data from the SWS annual assessment were compared against a reference site. No SWS habitat occurs on site or immediately adjacent to the site; therefore, a reference transect from one of HELIX's nearby projects (Carlsbad Raceway) was used as the reference transect for this project. The reference site is a 25-m transect along an unnamed tributary to Agua Hedionda Creek (approximately 2 miles to the east of the Fox-Miller site).

Counts of the number of flowering thread-leaved brodiaea within the translocation plot and the 5 reference plots (Figure 4) were conducted by Mr. Kurnow on May 7, 12, 20, and 28, 2010, and June 5, 10, and 19, 2010. Ms. Harris assisted Mr. Kurnow with the plot counts on May 7 and 12, 2010. Reference plots are the same size as the translocation plot. Data was collected on 7 separate occasions within the blooming period, and data collection occurred the same day for each plot. A GPS unit with sub-meter accuracy was used to record the number of flowering individuals per plot. Thread-leaved brodiaea counts were only conducted for the translocation plot and 1 reference plot on May 28 because problems with the GPS unit prevented accurate counts in the other 4 reference plots. Data within each plot was overlaid and individuals that were recorded multiple times were not double counted in the analysis below.

Nineteen photographs were taken from previously established photo locations (Figure 3; Appendix A). A list of all plant species within each 250-m² belt transect was compiled and is presented as Appendix B, and a list of animal species detected within the site is presented as Appendix C.

3.0 SUCCESS CRITERIA

Success criteria for the thread-leaved brodiaea/DCSS/NG/SWS restoration areas outlined in this report are specified in the Restoration Plan (RECON 2005). Success criteria are intended to help determine the successful completion of the 5-year mitigation and monitoring program.

Attainment of the success criteria indicates that the restoration is progressing toward the desired habitat function and services. Under the project's Restoration Plan, native cover and species diversity (the number of species in an area) success criteria for DCSS, NG, and SWS are based on reference areas located within the open space easement. Non-native species cover and target weed species cover are based on absolute cover criteria and are not relevant to a reference area. Species diversity and native species cover are expected to increase annually as the habitat within each restoration area grows and matures. Non-native plant species are typically a problem within habitat restoration, particularly at the beginning of a restoration project. With continued maintenance and as native habitat develops, non-native species become less problematic.

If project success criteria are not being met, corrective measures will be taken. This could include additional planting/seeding, increased maintenance efforts, change in approach to the treatment of non-native species, installation of irrigation, and any changes to irrigation schedules if irrigation is installed.

3.1 THREAD-LEAVED BRODIAEA

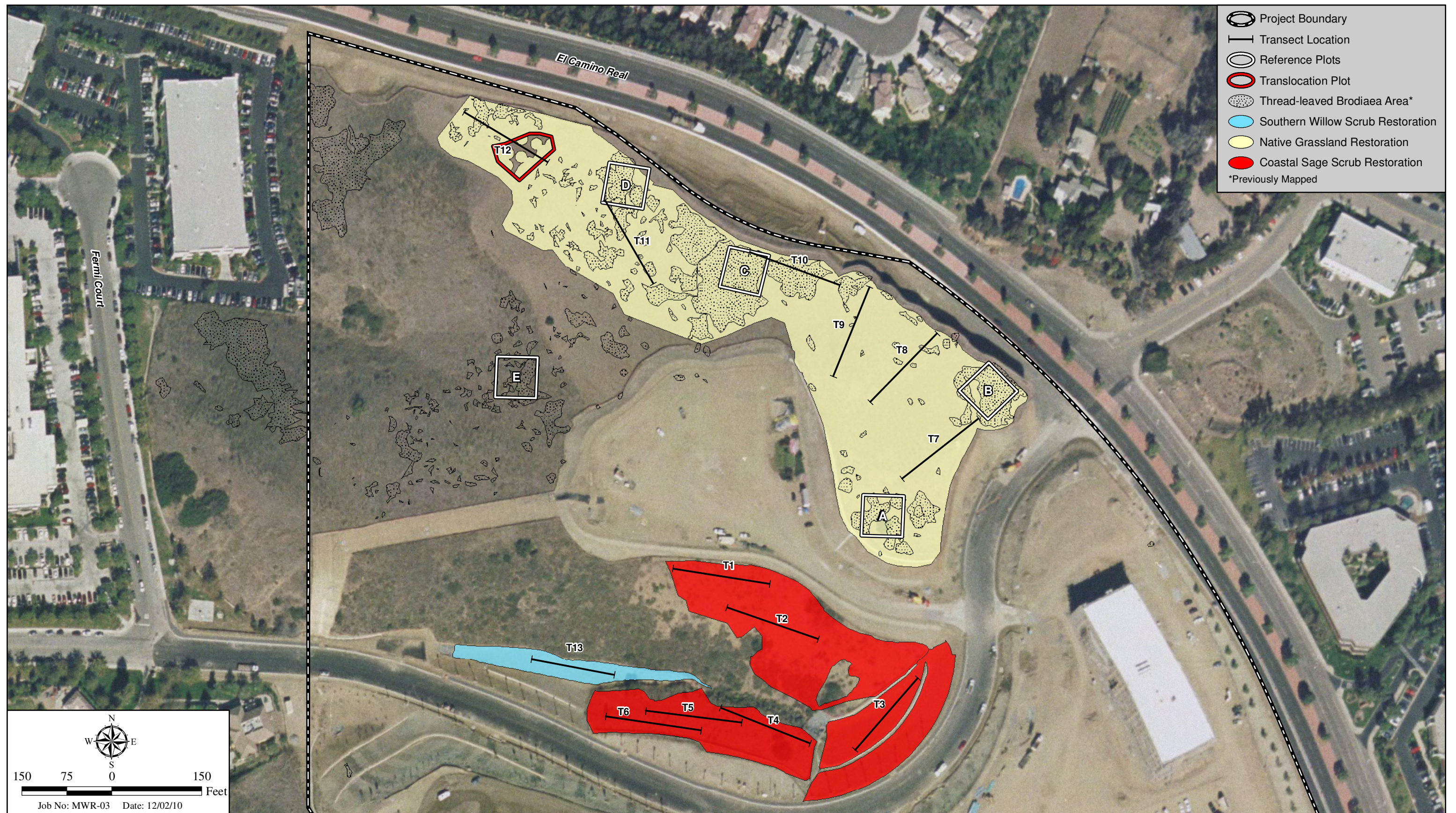
At the end of the 5-year monitoring period, the number of thread-leaved brodiaea in the translocation area should exceed the number of thread-leaved brodiaea impacted (relocated) by the construction project. There are no specific cover or species richness criteria for thread-leaved brodiaea; however, the Restoration Plan states that the following criterion must be met in order for the brodiaea restoration project to be successful:

- The relocated population must exhibit similar patterns to that of the reference populations, which are of similar size.

To measure this, 5 populations of similar size and density are to be selected from the open space. The total number of flowering plants within each of these will be counted each year and compared to the translocated population.

3.2 DIEGAN COASTAL SAGE SCRUB

The restoration area should support 2.42 acres of viable DCSS habitat at the end of the 5-year monitoring period. Specific success criteria for species diversity, native species cover, non-native species cover, and target non-native species cover were established in the Restoration Plan and are presented below (Table 3).



Transect and Plot Locations

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Table 3
DIEGAN COASTAL SAGE SCRUB SUCCESS CRITERIA MILESTONES

CRITERIA	YEAR				
	1	2	3	4	5
Minimum species diversity*	--	50%	70%	80%	80%
Minimum percent native species cover *	--	25%	40%	60%	75%
Maximum percent non-native species cover	5%	5%	5%	5%	5%
Maximum percent target weed species cover†	0%	0%	0%	0%	0%

*Relative to a reference site

†Target weed species are those listed on the California Invasive Plant Council (Cal-IPC) list of “Exotic Pest Plants of Greatest Ecological Concern” (2006), with the exception of brome grasses

For Year 4, the DCSS restoration area is expected to have species diversity equal to 80 percent of the reference area and native cover equal to at least 60 percent of the reference area (Table 3). Species diversity is the number of species in a given area. The Restoration Plan also requires non-native species to comprise less than 5 percent absolute cover in the restoration area and that there be no target weed species (Table 3).

3.3 NATIVE GRASSLAND

The restoration area should support 1.01 acres of viable NG habitat at the end of the 5-year monitoring period. Specific success criteria for species diversity, native species cover, non-native species cover, and target non-native species cover were established in the Restoration Plan and are presented below (Table 4).

Table 4
NATIVE GRASSLAND SUCCESS CRITERIA MILESTONES

CRITERIA	YEAR				
	1	2	3	4	5
Minimum species diversity*	40%	50%	70%	80%	80%
Minimum percent native species cover*	15%	25%	40%	50%	60%
Maximum percent non-native species cover	5%	5%	5%	5%	5%
Maximum percent target weed species cover†	0%	0%	0%	0%	0%

*Relative to a reference site

†Target weed species are those listed on the Cal-IPC list of “Exotic Pest Plants of Greatest Ecological Concern” (2006), with the exception of brome grasses

For Year 4, the NG restoration area is expected to have species diversity equal to 80 percent of the reference area and native cover equal to at least 50 percent of the reference area. Species diversity is the number of species in a given area. The Restoration Plan also requires non-native species to comprise less than 5 percent absolute cover in the restoration area and that there be no target weed species (Table 4).

3.4 SOUTHERN WILLOW SCRUB

The restoration area should support 0.25 acre of viable SWS habitat at the end of the 5-year monitoring period. Specific success criteria for species diversity, native species cover, non-native species cover, and target non-native species cover were established in the Restoration Plan and are presented below (Table 5).

For Year 4, the NG restoration area is expected to have species diversity equal to 80 percent of the reference area and native cover equal to at least 80 percent of the reference area. Species diversity is the number of species in a given area. The Restoration Plan also requires non-native species to comprise less than 5 percent absolute cover in the restoration area and that there be no target weed species (Table 5).

Table 5 SOUTHERN WILLOW SCRUB SUCCESS CRITERIA MILESTONES					
CRITERIA	YEAR				
	1	2	3	4	5
Minimum species diversity*	---	50%	70%	80%	80%
Minimum percent native species cover*	---	40%	75%	80%	90%
Maximum percent non-native species cover	5%	5%	5%	5%	5%
Maximum percent target weed species cover†	0%	0%	0%	0%	0%

*Relative to a reference site

†Target weed species are those listed on the Cal-IPC list of “Exotic Pest Plants of Greatest Ecological Concern” (2006), with the exception of brome grasses

4.0 RESULTS

The 2010 annual assessment results are described in detail below for thread-leaved brodiaea and for DCSS, NG, and SWS habitats.

4.1 MAINTENANCE

HECG has performed routine (monthly) maintenance in NG, DCSS, and SWS restoration areas. They also conducted supplemental seeding and planting in the DCSS restoration area and supplemental seeding in the NG restoration area (Table 1).

4.2 MAINTENANCE MONITORING

This section details the qualitative results of the entire 2010 monitoring period for thread-leaved brodiaea/DCSS/NG/SWS.

4.2.1 Thread-leaved Brodiaea

Non-flowering thread-leaved brodiaea was first observed in December 2009 throughout the NG restoration area. The number of leafing individuals peaked in February-March and the locations observed were similar to that noted in the Restoration Plan. Flowering individuals were first observed in late April 2010. At this time, only a few individuals were observed. The peak of the blooming period occurred mid-May, with flowering individuals found in low to moderate densities throughout the NG, which is typical for this site. By July 1, 2010, the blooming period had ended. Quantities of flowering individuals were considerably lower than non-flowering individuals, which is typical for this species. The distribution of flowering individuals in the NG restoration area was similar to the distribution of flowering individuals in the open space.

4.2.2 Diegan Coastal Sage Scrub

A majority of native DCSS plants are in good health, with new growth observed on many individuals. Some mortality occurred, but the overall mortality rate remains low. Native germination on the northern slope is low, low/moderate on the eastern slope, and minimal on the southern slope. California sagebrush (*Artemisia californica*) was the primary germinating species on the eastern slope, while California encelia (*Encelia californica*) was the primary germinating species on the northern slope. Accounting for all these factors, the site has increased its native species cover in 2010. Non-native plant species cover was generally low throughout 2010, but peaked several times in response to rainfall. Maintenance personnel were directed to treat and remove weeds prior to them setting seed.

4.2.3 Native Grassland

Native cover fluctuated throughout the year since most of the cover comes from annual species. Cover was minimal in January, increasing steadily into March. This coincided with the germination of thread-leaved brodiaea and blue dicks (*Dichelostemma capitatum*). Cover then decreased prior to the thread-leaved brodiaea blooming period, which peaked in mid-May. This spike in cover was much smaller than that in March, but included small flowered morning glory (*Convolvulus simulans*). Fascicled tarplant (*Deinandra fasciculata*) contributed to native cover in late-spring and early-summer, but cover steadily declined through the end of June. Purple needlegrass and coyote bush (*Baccharis pilularis*) are the only perennial species observed within the NG. Densities of purple needlegrass are high within the planting plots established in 2009 (HELIX 2009b). Outside the planting plots, only a handful of large purple needlegrass plants were observed.

Shortly after the first winter rains, high density of non-native species germinated throughout the NG restoration area. These were primarily non-native grasses (NNG's), which blanketed the restoration area. Other species such as mustard (*Brassica* sp), artichoke thistle (*Cynara*

cardunculus), sow thistle (*Sonchus oleraceus*), and bristly ox-tongue (*Picris echoides*) were also present. NNG's remained dominant through spring, while the abundance of bristly ox-tongue, wild lettuce (*Lactuca sericia*), mustard, and other broad-leaf species began to increase in early spring. By May, most of the grass had set seed and many broad-leaf species reached their greatest densities. Over the next few months, new recruitment of non-native species was low, and most had set seed by late June/early July. Only minimal germination of non-native species (primarily broad-leaved species) was detected for the remainder of the year.

HECG was limited in their weeding effort between January and July 2010 due to the presence of thread-leaved brodiaea. Despite this, they were able to greatly reduce the amount of mustard, fennel (*Foeniculum vulgare*), and artichoke thistle by the end of spring. Because of these efforts, there was only a low number of these 3 species observed in May and through the remainder of 2010.

4.2.4 Southern Willow Scrub

Native cover remained high through most of the year. Tree/shrub mortality was not evident, although some mule fat (*Baccharis salicifolia*) individuals showed minor leaf die back. Perennial native shrubs and trees appear to have become well established because of the lack of mortality in the absence of irrigation. In late summer/early fall, there was increased growth of established plants and high density of annual species (primarily marsh fleabane [*Pluchea odorata*]). Non-native plant species cover generally remained low throughout the year. The primary non-native species observed has been annual beard grass (*Polypogon monspeliensis*).

4.2.5 Open Space Areas

Maintenance of open space areas on site was restricted to the grassland open space area (i.e., maintenance of the DCSS open space is not being conducted). Weeding activities in the grassland open space were primarily focused on controlling fennel and mustard. Some efforts were made to begin to control non-native grasses, but HELIX and HECG have reservations about reducing non-native grass cover within the open space (see discussion section below).

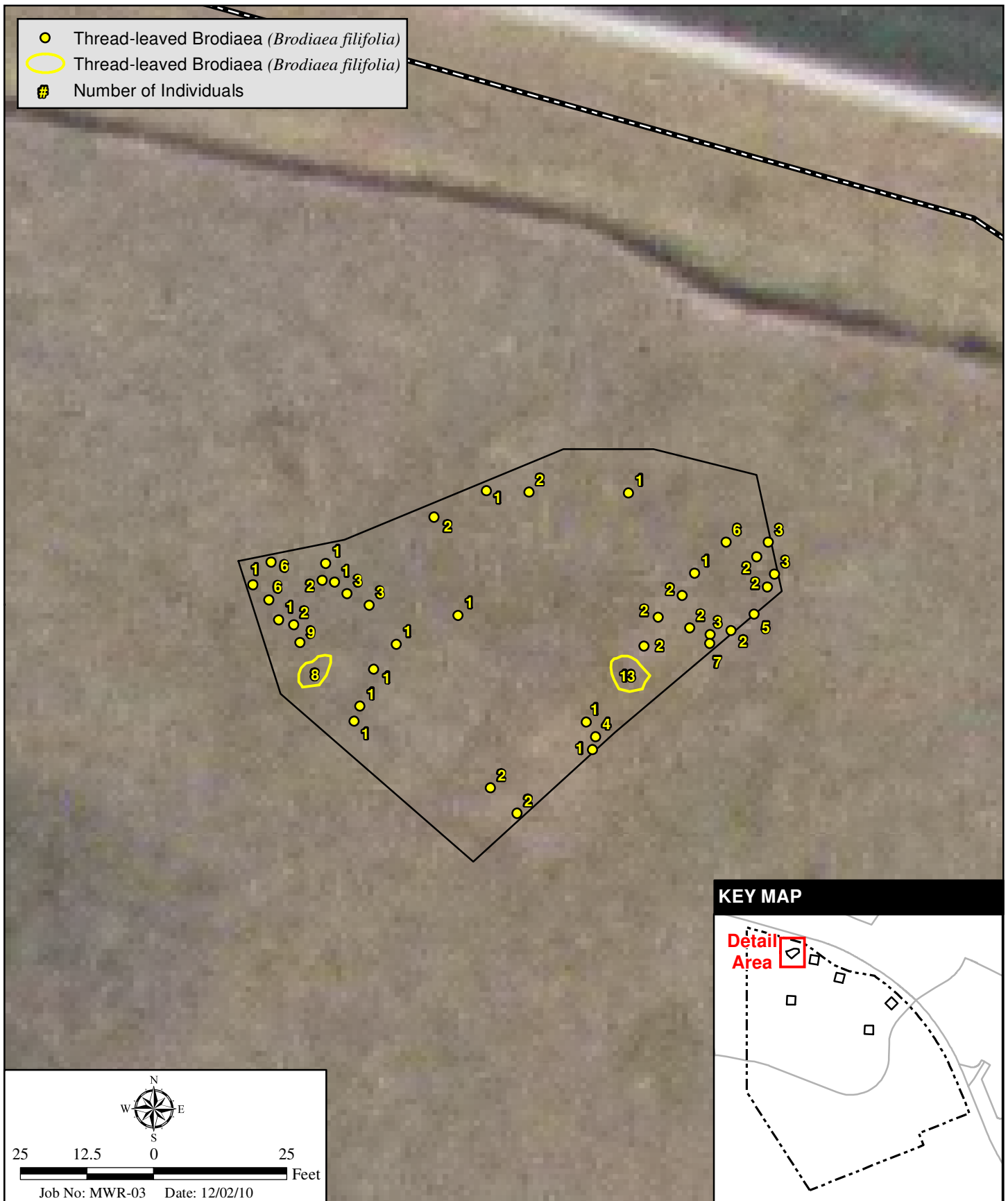
An owl box was installed in June 2009 to help control gopher activity in the restoration and open space areas on site. There was no evidence that the box was used in 2010.

4.3 ANNUAL TECHNICAL MONITORING

This section details the quantitative results of the 2010 annual technical monitoring for thread-leaved brodiaea/DCSS/NG/SWS.

4.3.1 Thread-leaved Brodiaea

Approximately 119 thread-leaved brodiaea individuals were observed in flower within the translocation plot (Graph 1; Figure 5a). Reference plots ranged from a low of 753 flowering individuals to a high of 2611 flowering individuals (Graph 1; Figures 5b to 5f). The number of flowering individuals within the translocation plot is lower than the reference plots, which

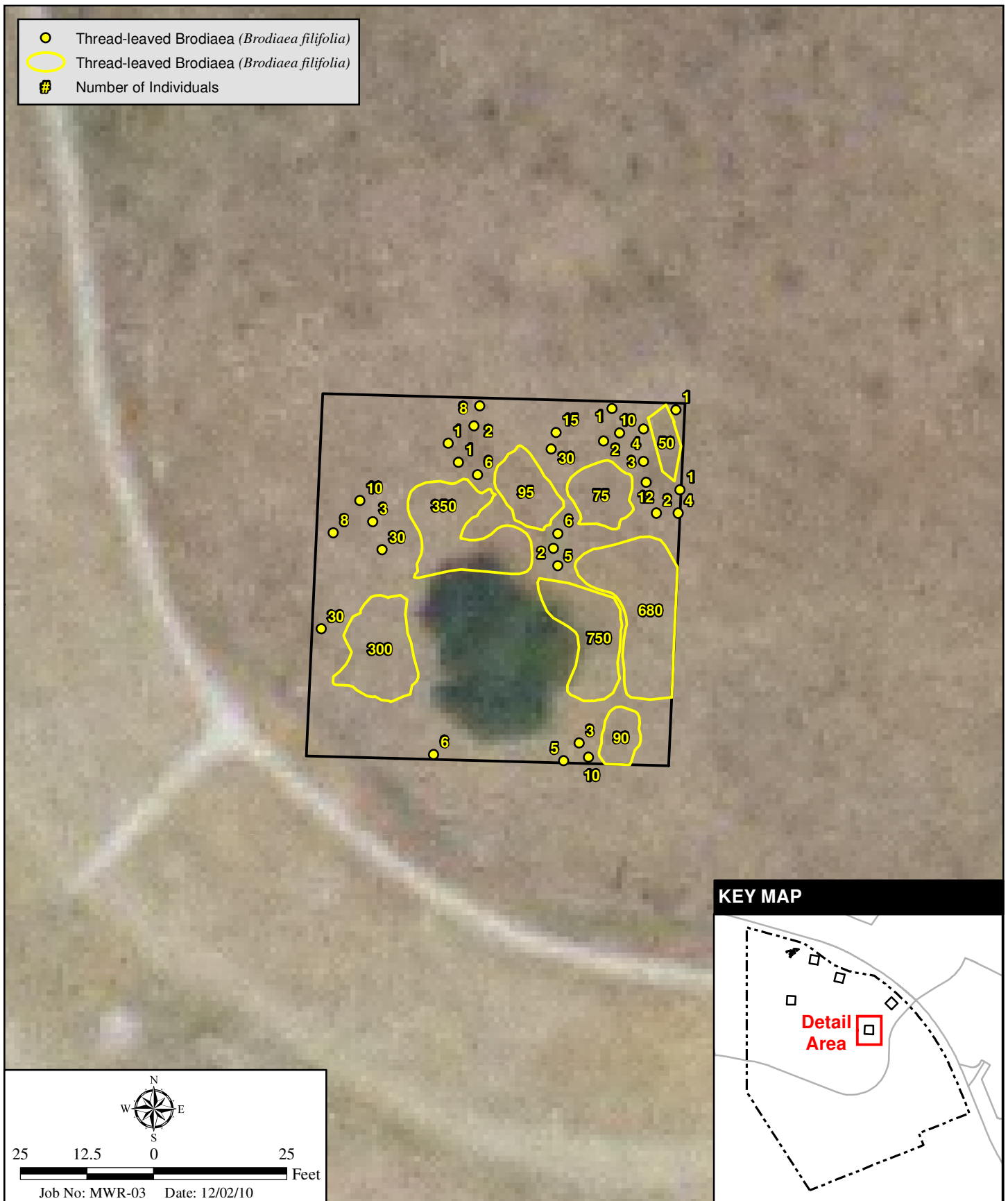


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Quantity and Distribution of Flowering Thread-leaved Brodiaea (*Brodiaea filifolia*) Individuals - Translocation Plot

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Figure 5a



Quantity and Distribution of Flowering Thread-leaved Brodiaea (*Brodiaea filifolia*) Individuals - Reference Plot A

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Figure 5b

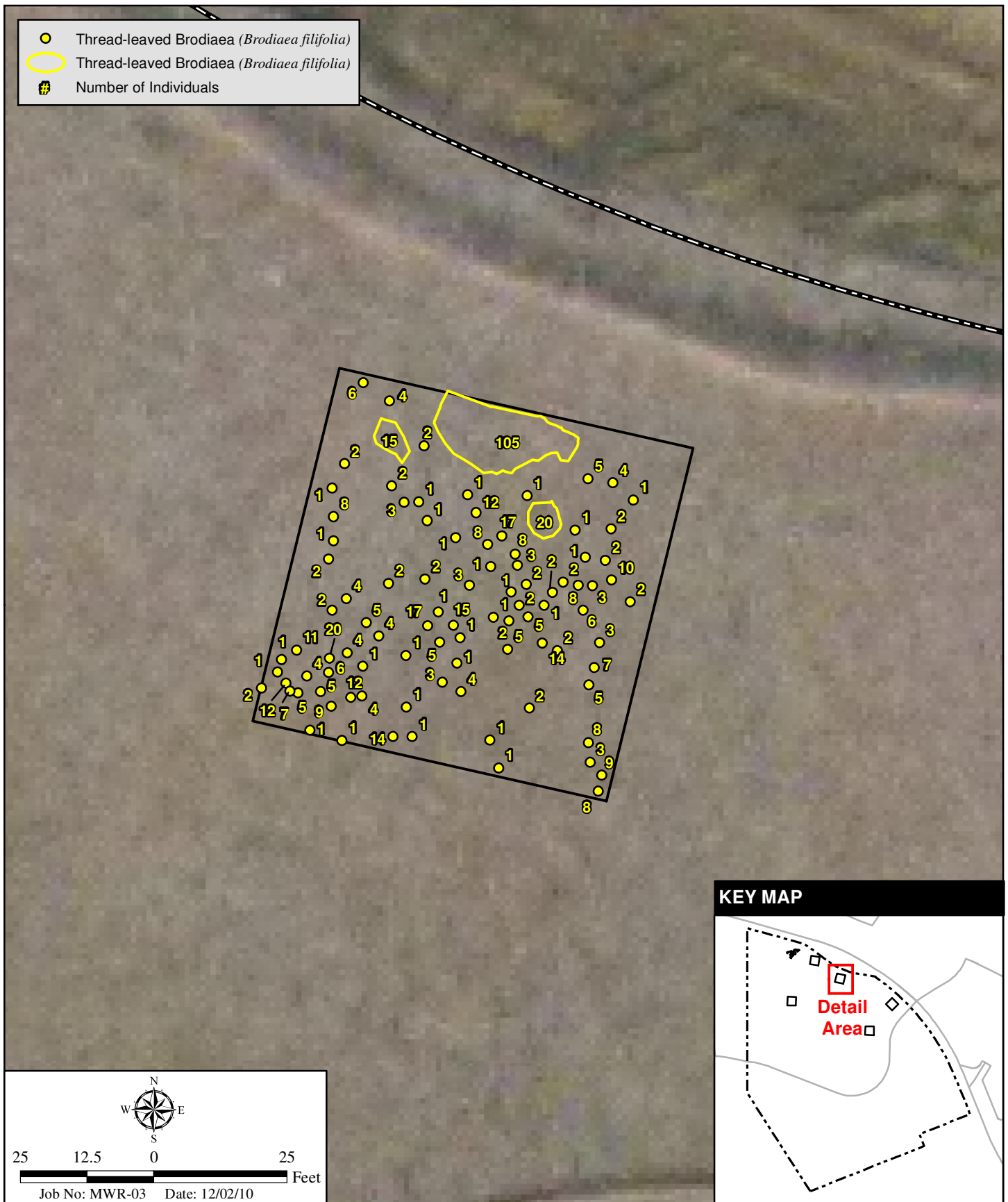


E:\ArcGIS\MMWR-01 Fox Property\Map\BIO\Annual_Assessment\2010\Final_Report\Fig5c_Brodiaea.mxd -RK

Quantity and Distribution of Flowering Thread-leaved Brodiaea (*Brodiaea filifolia*) Individuals - Reference Plot B

2010 ANNUAL REPORT FOR THE LOT 5 FOX-MILLER PROPERTY

Figure 5c



E:\ArcGIS\MMWR-01 Fox Property\Map\BIO\Annual_Assessment\2010\Final_Report\Fig5d_Brodiaea.mxd -RK

Quantity and Distribution of Flowering Thread-leaved Brodiaea (*Brodiaea filifolia*) Individuals - Reference Plot C

2010 ANNUAL REPORT FOR THE LOT 5 FOX-MILLER PROPERTY

Figure 5d

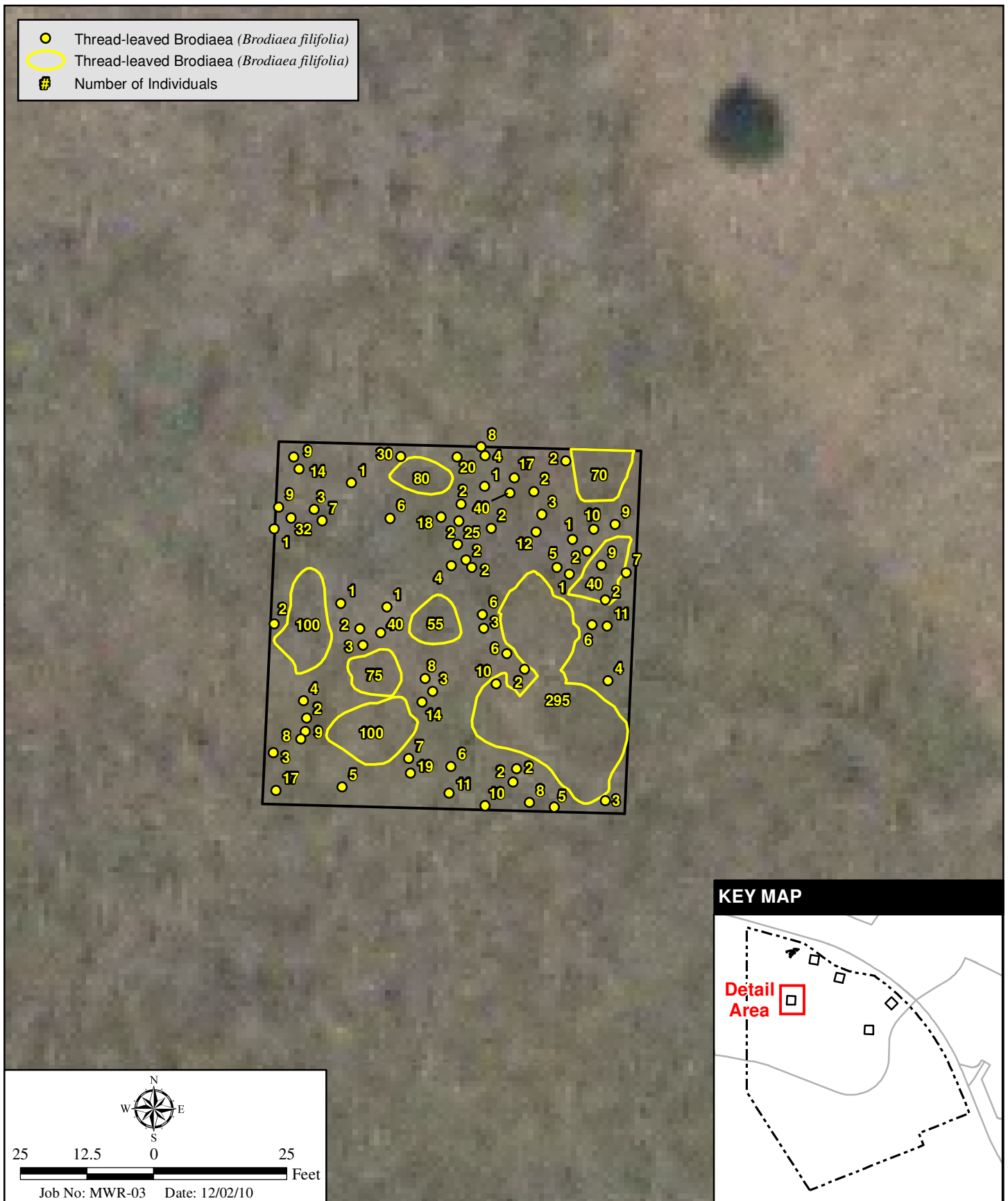


E:\ArcGIS\MMWR-01 Fox Property\Map\BIO\Annual_Assessment\2010\Final_Report\Fig5e_Brodiaea.mxd -RK

Quantity and Distribution of Flowering Thread-leaved Brodiaea (*Brodiaea filifolia*) Individuals - Reference Plot D

2010 ANNUAL REPORT FOR THE LOT 5 FOX-MILLER PROPERTY

Figure 5e



E:\ArcGIS\MMWR-01 Fox Property\Map\BIO\Annual_Assessment\2010\Final_Report\Fig5f_Brodiaea.mxd -RK

Quantity and Distribution of Flowering Thread-leaved Brodiaea (*Brodiaea filifolia*) Individuals - Reference Plot E

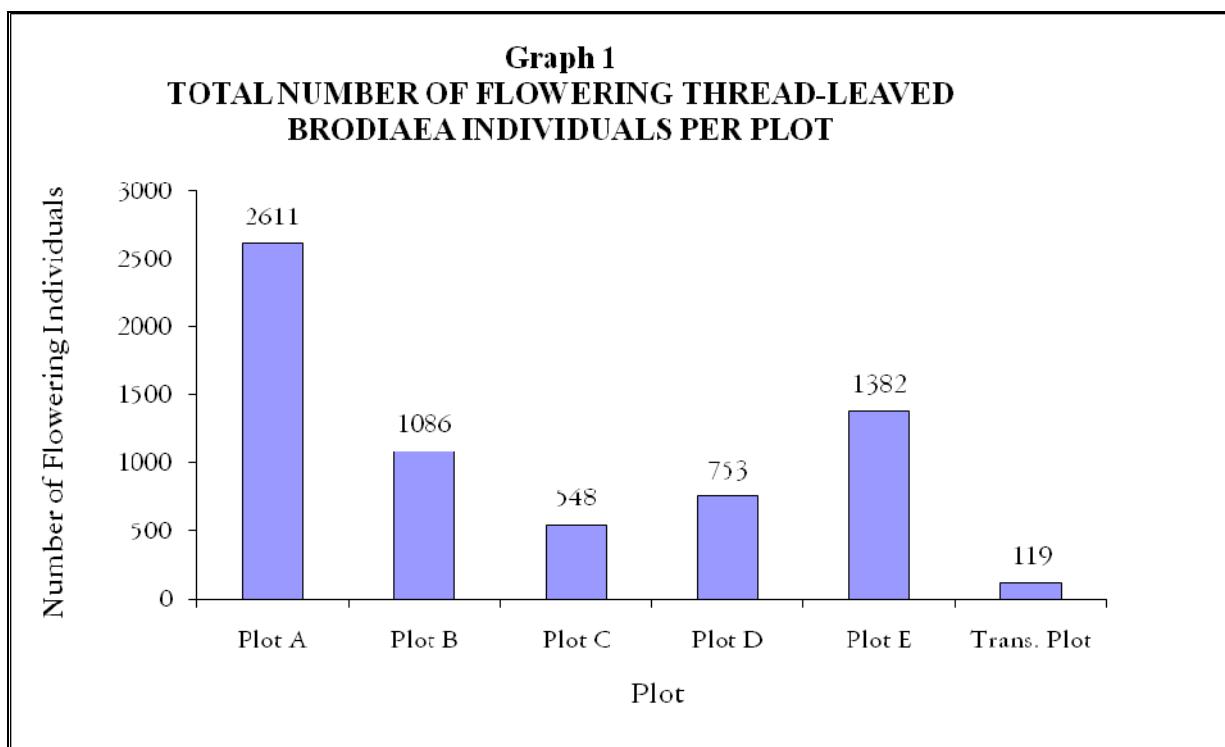
2010 ANNUAL REPORT FOR THE LOT 5 FOX-MILLER PROPERTY

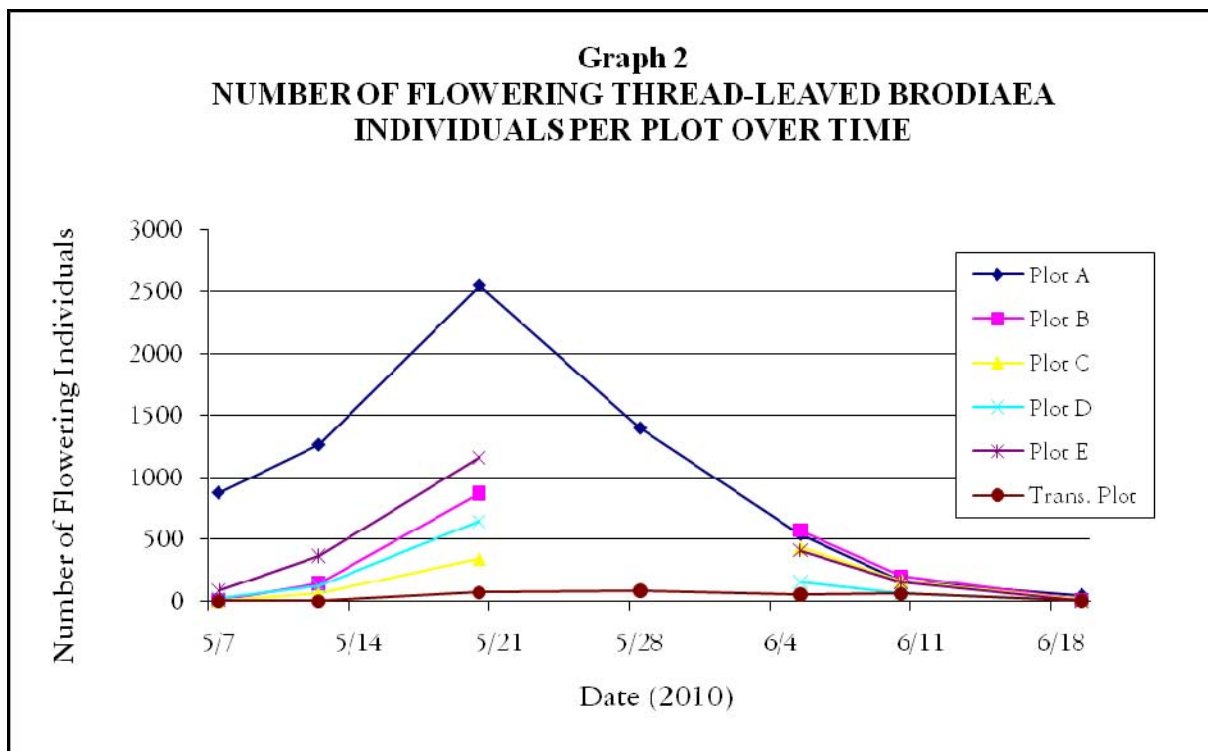
Figure 5f

is not unexpected given that the density of individuals translocated was much lower than the density of brodiaea in the preserved areas. The project was designed to maximize the preservation of the highest densities of thread-leaved brodiaea and to translocate the soil that had the lowest density of individuals. While the size of the translocation plot is the same as the reference plots, data on the density of thread-leaved brodiaea within each of the reference plots was not available at the time the plots were chosen in 2008. but is 20 percent greater than the approximately 99 flowering thread-leaved brodiaea counted in 2009 (HELIX 2009b).

The number of flowering individuals within all plots peaked during mid-May (Graph 2). This is consistent with other thread-leaved brodiaea populations HELIX monitored in 2010, which include the Taylor property located in Oceanside and the Rancho Santalina property located in San Marcos. It is also consistent with the 2009 thread-leaved brodiaea data for this site.

Both the translocation plot and reference plots had a high density of non-native grass species, including wild oats (*Avena fatua*), Italian rye grass (*Lolium multiflorum*), and false brome (*Brachypodium distachyon*). Bristly ox-tongue was also present within each of the plots.





4.3.2 Diegan Coastal Sage Scrub

In Year 4, the DCSS restoration area had high average native species diversity (11 species), moderate native species cover (60 percent), and low non-native species cover (12 percent; Table 6). Native species diversity has remained high over the past 2 years with a total of 25 native species recorded in both 2009 and 2010. Species richness among transects varied between 9 and 14 individuals (Graph 3). Native species cover increased from 42 percent in Year 3 to 60 percent in Year 4. Dominant species include California sagebrush (*Artemisia californica*), California encelia (*Encelia californica*), and saw toothed goldenbush (*Hazardia squarrosa*).

Table 6
YEAR 4 RESULTS FOR THE DIEGAN COASTAL SAGE SCRUB
RESTORATION AREA

CRITERION	Reference Site	Year 4 Standard	Restoration Area
Species diversity	8	6*	11
Native species cover	90%	54%*	60%
Non-native species cover	20%	5%**	12%
Target weed species cover†	20%	0%**	4%

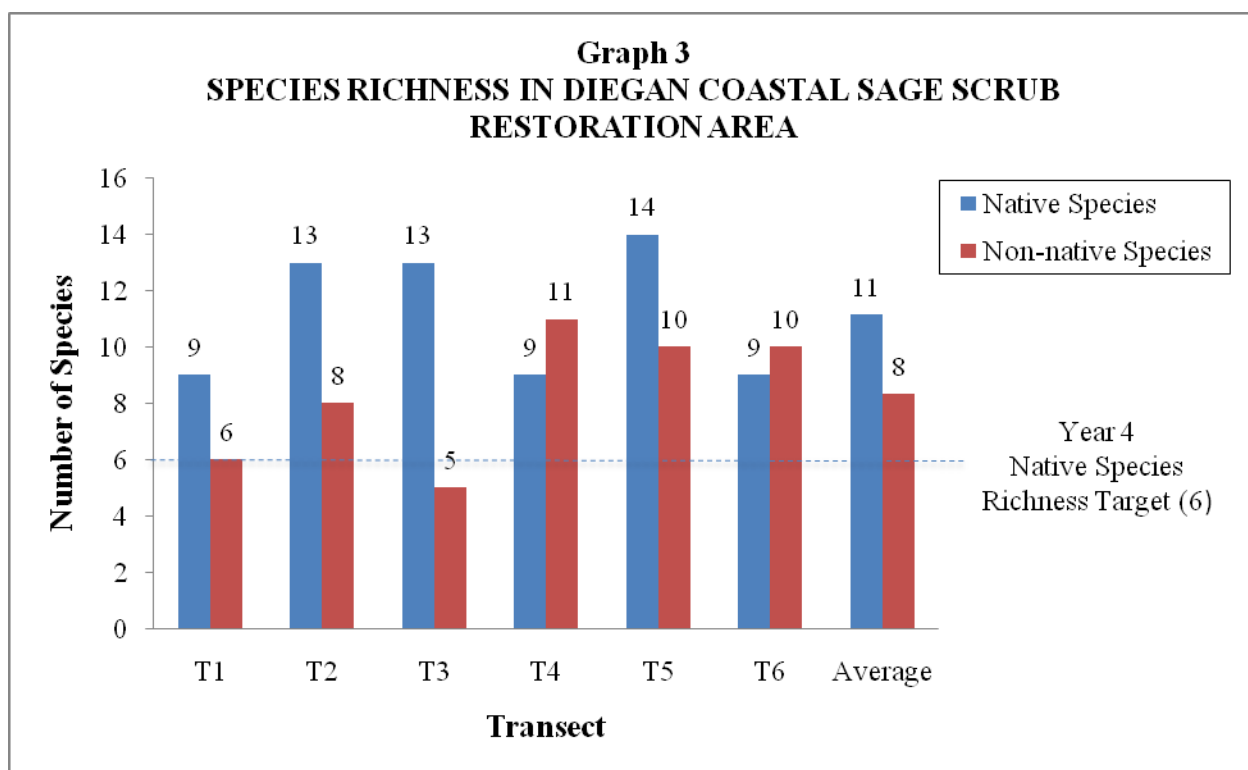
†Target weed species are those listed on the Cal-IPC list of “Exotic Pest Plants of Greatest Ecological Concern” (1999), with the exception of brome grasses

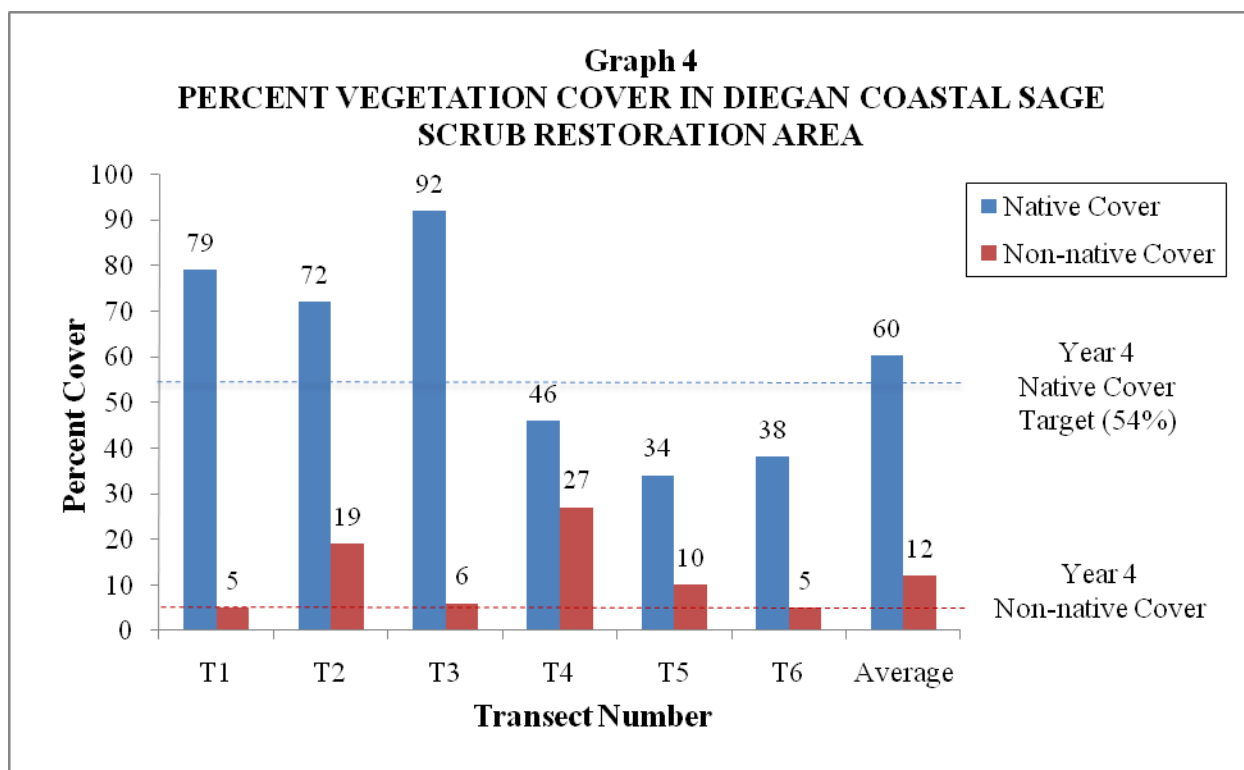
*Minimum amounts needed to meet Year 4 success criteria

**Maximum percentage allowable to meet Year 4 success criteria

There has been a continual decrease in non-native cover since 2008. Non-native species cover in 2008 was at 50 percent. Last year non-native cover dropped to 23 percent, with non-native cover now at 12 percent. Target weed species cover dropped from 13 percent in 2009 to 4 percent in 2010. Star thistle (*Centaurea melitensis*) was the primary target weed species observed in the restoration area at the time of the annual assessment.

The DCSS restoration area met the success criteria for species diversity and native species cover, but did not meet non-native species cover or target weed cover (Table 6; Graphs 3 and 4). Non-native species cover composition was highest on the southern slope where the primary non-native species was scarlet pimpernel (*Anagallis arvensis*). NNG's occurred throughout the DCSS restoration area in low numbers.





4.3.3 Native Grassland

In Year 4, the NG restoration area had moderate average native species diversity (4 species), low native species cover (12 percent), and high non-native species cover (100 percent; Table 7). The total number of native species within the NG restoration area has slowly increased from 6 species in 2008 to 8 species in 2010. New species detected during the 2010 annual assessment include common goldenstar (*Bloomeria crocea*) and morning glory (*Calystegia macrostegia*). Species richness among transects varied between 1 and 7 individuals (Graph 5). Native cover within this 3 year period has also increased from 2 percent to 12 percent. The increase is attributed to small flowered morning glory. Native cover among transects varied between 1 and 21 percent (Graph 6).

Table 7 YEAR 4 RESULTS FOR THE NATIVE GRASSLAND RESTORATION AREA			
Criterion	Reference Site	Year 4 Standard	Restoration Area
Species diversity	1	1 *	4
Native species cover	20%	10% *	12%
Non-native species cover	100%	5% **	100%
Target weed cover†	20%	0% **	5%

†Target weed species are those listed by the Cal-IPC list of “Exotic Pest Plants of Greatest Ecological Concern” (1999), with the exception of brome grasses

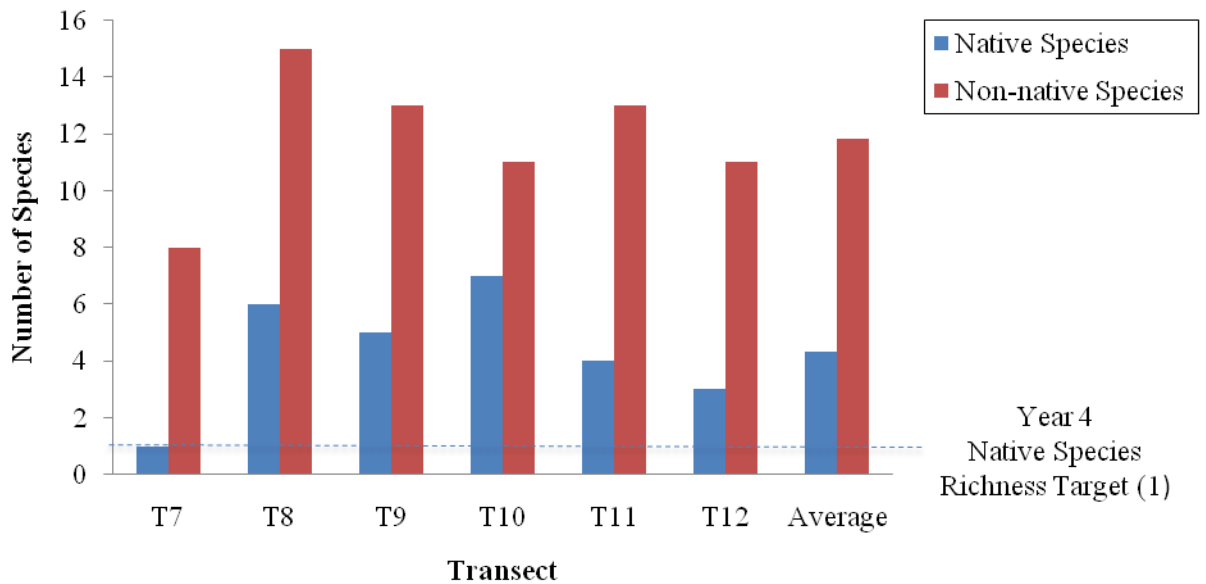
*Minimum amounts needed to meet Year 4 success criteria

**Maximum percentage allowable to meet Year 4 success criteria.

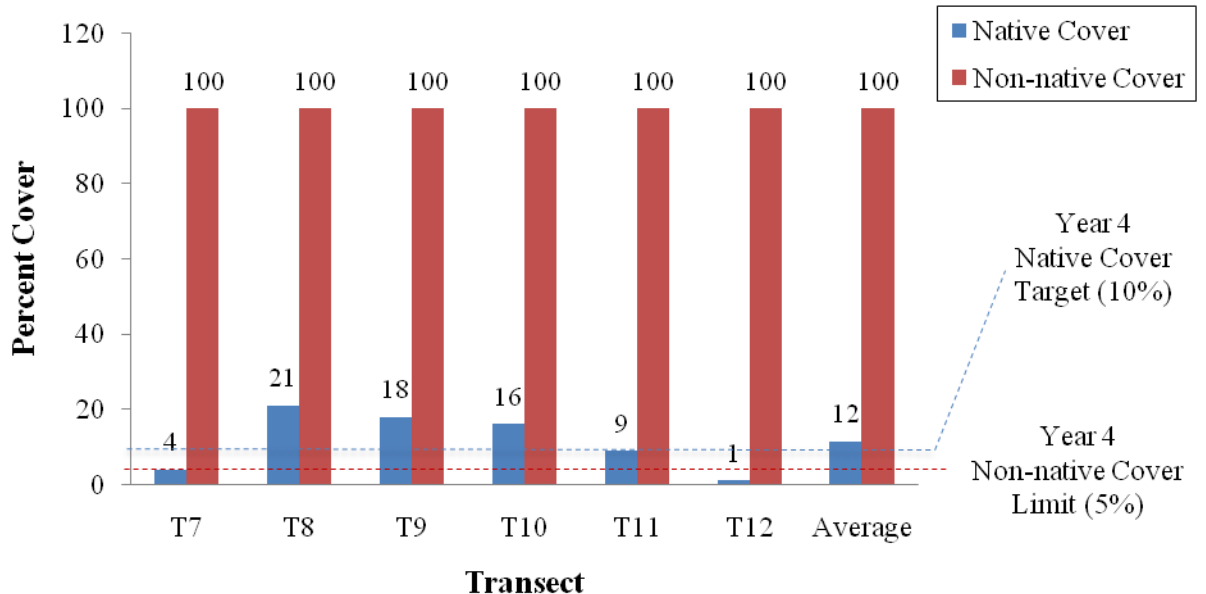
Target weed species (primarily black mustard and star thistle) were observed within the restoration area. Dominant non-native species included purple false brome, wild oats, Italian rye grass, and bristly ox-tounge. Fennel and mustard occurred in very low densities. Non-native cover has remained high at 100 percent, which is the same density recorded in 2008. Quantitative data has been recorded since 2009. The density of broad-leaf species within the NG restoration area has increased within this 2 year period (from 18 to 28 percent). In both years bristly ox-tounge was the primary broad-leaf species. Target weed cover was 15 percent lower than 2009.

The NG restoration area met the success criteria for species diversity and native cover, but did not meet non-native species cover, or target weed cover (Table 7; Graphs 5 and 6).

Graph 5
SPECIES RICHNES IN NATIVE GRASSLAND RESTORATION
AREA



Graph 6
PERCENT VEGETATION COVER IN NATIVE GRASSLAND
RESTORATION AREA



4.3.4 Southern Willow Scrub

In Year 4, the SWS restoration area had high native species diversity (14 species), high native species cover (99 percent), and little non-native species cover (4 percent in the transect, less than 5% overall; Table 8). No target weed species were observed within the restoration area. Native cover was primarily due to increased growth of willows (*Salix* sp.) and marsh fleabane. Understory species included marsh fleabane, San Diego marsh elder (*Iva hayesiana*), salt grass (*Distichlis spicata*), prairie rush (*Scirpus meritimus*), and spiny rush (*Juncus acutus*). Prairie rush was the only new species observed in 2010.

Thus, the SWS restoration area met the Year 4 success criteria for diversity, native species cover, non-native species cover, and target weed cover (Table 8; Graphs 7 and 8). Native cover increased from 76 percent in 2009 to 99 percent in 2010 and diversity has remained high (14 species in 2010).

Table 8 YEAR 4 RESULTS FOR THE SOUTHERN WILLOW SCRUB RESTORATION AREA			
Criterion	Reference Site	Year 4 Standard	Restoration Area
Species diversity	11	9	14
Native species cover	98%	78%	99%
Non-native species cover*	< 5%	5%	4%
Target weed cover†	0%	0%	0%

†Target weed species are those listed by the Cal-IPC list of “Exotic Pest Plants of Greatest Ecological Concern” (1999), with the exception of brome grasses

*Maximum percentage allowable to meet Year 4 success criteria.

5.0 DISCUSSION

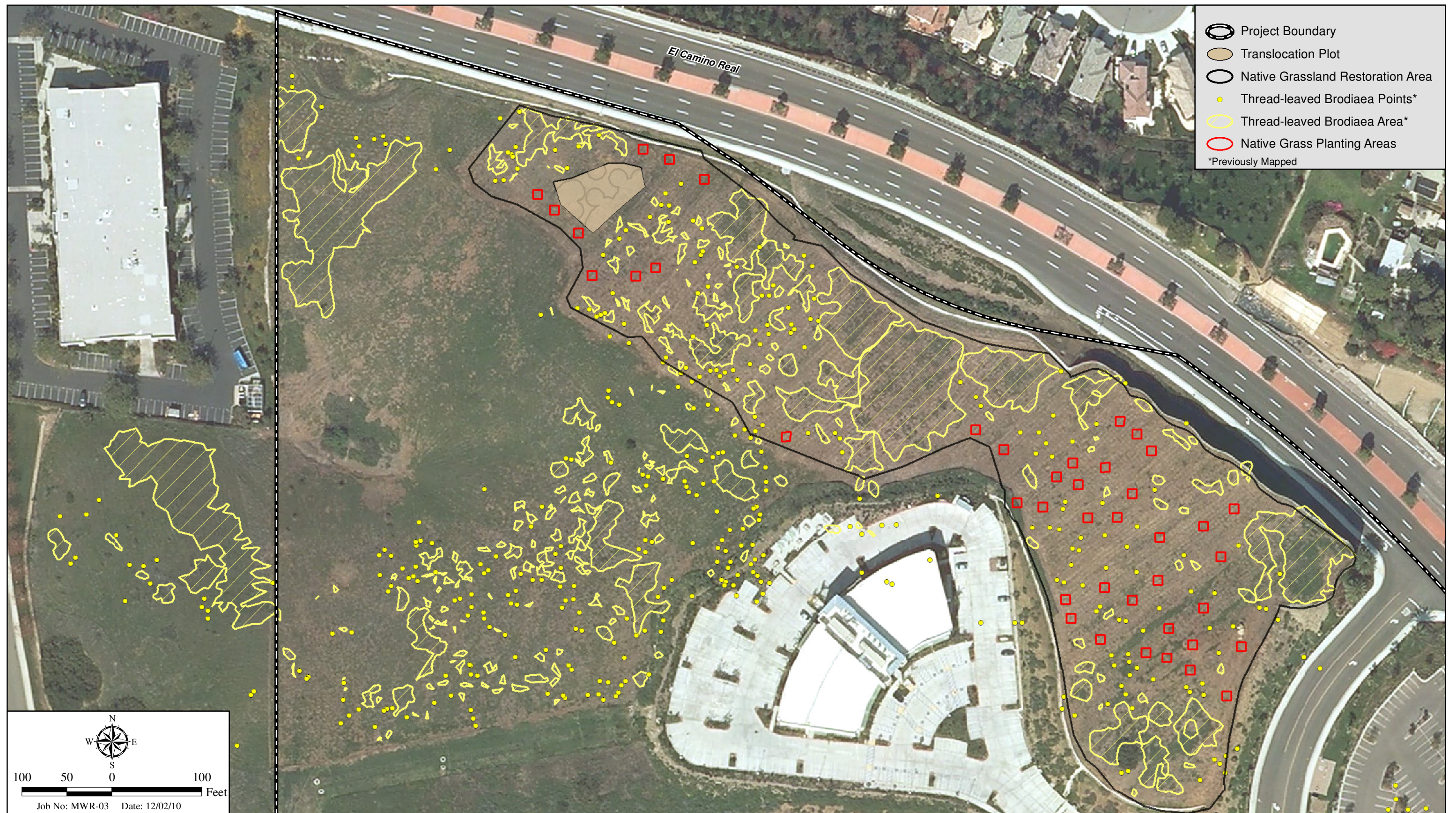
At the end of 2010 (Year 4), the DCSS/NG/SWS restoration areas are progressing towards their final success criteria. Significant steps were taken over the last year to reduce the amount of non-native cover and to increase the native cover within the restoration areas.

As was the case in 2009, 1 of our main focuses within the DCSS restoration area during 2010 was to increase native cover. Mortality was low, but there was little growth of established plants, and minimal germination. To bolster native cover, supplemental planting and seeding occurred early in the year. This included planting 100 one-gallon container stock February 16-17, 2010 and re-seeding the area with 34.2 lbs on February 18, 2010. This additional effort coupled with a good spring growing season and minimal mortality (despite irrigation being shut off in December 2009), resulted in an increase in cover, from 42 percent in Year 3 to 60 percent in Year 4. If mortality remains low, and the site has another good growing season, it should reach the final success criteria for native cover of 72 percent by late spring/early summer of 2011.

Restoration in the NG has presented a challenge because the on-site distribution of thread-leaved brodiaea (Figure 3) and the duration of when brodiaea is leafing/flowering (i.e., December through July) have limited the maintenance activities on site. The 2 major issues affecting the NG restoration are (1) the abundance of non-native vegetation and (2) the minimal amount of native plant species cover.

The Restoration Plan for this project sets restrictions on herbicide application within the NG once thread-leaved brodiaea is present. A majority of the non-native species within the NG are annuals that emerge in the winter/spring and complete their life cycle by summer. This coincides with the period thread-leaved brodiaea is active. NNG's are primarily the first species to emerge, with germination triggered by rain events. This was the case in December 2009, when winter rains triggered a mass germination of NNG's. At this time, thread-leaved brodiaea was also beginning to emerge. Weed management in brodiaea areas (majority of the 4.2-acre NG restoration area [see Figure 4]) was limited to hand-weeding, which proved to be ineffective for controlling NNG's. Therefore, hand-weeding was limited to fennel, mustard, and bristly ox-tongue. In attempt to effectively manage NNG's over a portion of the NG restoration site, the restoration specialist delineated 3 areas located outside the 10 foot thread-leaved brodiaea buffer. The areas (totaling 0.26-acre) were delineated in March 2010 and all non-native species within them were treated with herbicide. It was not practical to delineate other areas due to the abundance of thread-leaved brodiaea and miniscule areas to treat when taking the 10-foot buffer into account. By the time it was determined safe to use herbicide over the entire NG (July 2010), the non-native grasses had dropped seed.

The project's Restoration Plan states that there can be no greater than 5 percent non-native cover within the NG restoration area, including non-native grasses. This 5 percent threshold for non-native grasses should be considered an oversight and a mistake because it is not possible to reduce non-native grass cover to less than 5 percent by hand weeding. The 5 percent threshold is also problematic for several reasons, primary of which is if non-native grass cover were reduced to less than 5 percent, other more problematic weed species would begin to dominate the site, as was seen in 2009 and 2010. Unlike 2010, thread-leaved brodiaea began to emerge in late January 2009. This allowed HECG to treat the entire NG restoration area in early January 2009. This was effective at controlling non-native grass species. In the absence of grasses, other invasive species quickly germinated, including bristly ox-tongue and prickly lettuce. A similar trend also occurred within the 3 polygons established in May 2010. These broadleaf weed species should be considered more of a threat to brodiaea because each plant has a greater surface area and would compete more aggressively with brodiaea for resources (space, light, nutrients, etc). Another reason why the non-native grass threshold is problematic is because planting of native grasses is limited to areas where brodiaea does not occur (Figure 6). Areas where brodiaea occurs have been repeatedly seeded with native grass species, with the most recent remedial seeding event occurring January 20 and 26, 2010. However, because the site cannot be irrigated, germination of native grass seed is heavily dependent on rainfall. The region has been suffering through numerous years of below-average rainfall, which is part of the reason why little native grass seed has germinated on site. HELIX's other thread-leaved brodiaea restoration sites (e.g., Rancho Santalina, Taylor Property, and La Costa Greens) have not required non-native grass species to be controlled as part of the restoration effort.



Native Grass Planting Areas within Native Grassland Restoration Area

2010 ANNUAL REPORT FOR THE LOT 5 FOX-MILLER PROPERTY

As a result of the reasons listed above, the 5 percent non-native cover criterion for the NG restoration area should be eliminated. Maintenance activities will continue to focus on eliminating Cal-IPC target species (e.g., mustard, fennel, bristly ox-tongue, etc) and increase native cover. Non-native grasses would be actively managed in areas where thread-leaved brodiaea does not occur and extra effort would be implemented to greatly increase native cover in these areas. HELIX has taken considerable steps to improve native cover within the NG area, but the constraints that brodiaea presents has limited and will continue to limit restoration activities on site.

Native cover has increased from 3 percent in 2009 to 12 percent in 2010. Although low, it is close to the 16 percent needed to meet Year 5 native cover criteria. Most of the cover came from small flower morning glory (*Convolvulus simulans*). Native grasses accounted for a small portion of cover among transects, but occur in high densities within the 42 100ft² plots scattered throughout the NG restoration area (Figure 6). Visual estimates of native cover within these plots range from 60 to 80 percent. This is significant since these areas occupy 1-acre of the NG restoration area. A couple of these plots occur along portions of Transects 7 and 9. Outside of these plots native grass cover was minimal despite an additional seeding effort occurring January 20 and 26, 2010. This was the second supplemental seeding event, with the first occurring January 21, 2009. A combination of below average rainfall, absence of irrigation, and high non-native grass cover are factors likely contributing to the low germination rate observed within the NG restoration area thus far.

Data within the NG restoration area was collected in May, which coincided with the start of the thread-leaved brodiaea blooming period. Given the life history of thread-leaved brodiaea and field observations, vegetation cover would be significantly higher if data was collected earlier in the year. This species requires several years to mature and only a fraction of mature individuals flower (USFWS 2005). In 2010 February and March marked the peak of the vegetation period for thread-leaved brodiaea on site. Visual estimates of native cover by thread-leaved brodiaea during this time of year were around 30 to 40 percent.

The SWS restoration area has meet Year 5 success criteria. The restoration site currently has high native cover, high species diversity, low non-native cover, and no target weed species. Native cover increased from 76 percent in 2009 to 99 percent in 2010 and diversity has remained high (17 species in 2009 and 14 species in 2010). The slight decrease in diversity is primarily attributed to the mortality of upland plants once located in this wetland community. Non-native species continue to be managed effectively.

Finally, flowering individuals within the thread-leaved brodiaea translocation plot has increased by 20 percent when compared to 2009 data. However, the total number of flowering individuals (119) is substantially lower than the reference plots. There was no obvious difference in non-native cover (for both density and species composition) between the translocation and reference plots. Also, the translocation plot has not been maintained differently from the rest of the NG, including the reference plots. HELIX did not document any human disturbance within the translocation plot and did not note any differences in pollinator species on the project site. One possibility for the difference in flowering individuals deals with the uncertain quantity of thread-leaved brodiaea that were translocated from the project's

footprint to the translocation plot. The number of thread-leaved brodiaea corms translocated from the project footprint was not determined and an estimate of the number of flowering individuals within the footprint was not determined prior to translocation (RECON 2005; RECON 2008). Baseline thread-leaved brodiaea data provided in the project's mitigation plan (RECON 2005) instead focused on the distribution of the species and the acreage of previously-mapped thread-leaved brodiaea within the impact area. Similarly, thread-leaved brodiaea density data is not available for the remainder of the NG restoration area or the project's open space (information is limited to the distribution of the species). When the reference plots were established by HELIX, a thread-leaved brodiaea distribution map was the only tool available. Plots were chosen with similar areas to the translocation plot that occurred in seemingly dense populations of thread-leaved brodiaea (Figure 4). Because of this, the reference plots may be in areas with denser thread-leaved brodiaea populations compared to the translocation site.

6.0 RECOMMENDATIONS

- Eliminate the 5 percent non-native cover criterion in the NG restoration area. This success criterion is not achievable without harming thread-leaved brodiaea. The intent of the NG restoration is to improve native cover and enhance the areas where thread-leaved brodiaea occurs rather than to cause harm to the species.
- Implement weeding strategy in NG restoration area that reduces invasive weed species. A post-emergent herbicide can be used during the time of year that thread-leaved brodiaea is not active. Weeding activities should continue to be closely coordinated with the restoration specialist.
- Implement plan to maximize germination and cover for NG area. Seed NG with native grass seed mix in early 2011, after the onset of seasonal rains. Additionally, plant native grasses (one-gallon container stock) within the 3 polygons established in March 2010. Recently planted grasses would be hand watered during establishment.

7.0 REFERENCES

- California Department of Fish and Game. 2008. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. URL: <http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf>. October.
- California Invasive Plant Council. 2006. Invasive Plant Inventory. URL: <http://www.cal-ipc.org/>. February.
- California Native Plant Society. 1996. Field Sampling Protocol. Located on the CNPS Internet home page.
- HELIX Environmental Planning, Inc. 2009a. 2008 Annual Assessment for the Salk Property. January 22.
- 2009b. Lot 5 Fox-Miller Property 2009 annual report. December 17.
- Hickman, J.C., ed. 1993. The Jepson Manual: Higher Plants of California. Berkeley: University of California Press. 1400 pp.
- Holland R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame-Heritage Program, State of California, Department of Fish and Game, Sacramento. 156 pp.
- RECON. 2008. 2007 Annual Report for the Habitat Restoration and Mitigation for Diegan Coastal Sage Scrub, Valley Needlegrass, with Thread-leaved Brodiaea and Southern Willow Scrub Wetland for the Salk OA Property, Carlsbad, California. 36pp. June 13.
- 2007a. Wetland As-built Plan for the Fox-Miller Property, Carlsbad, California. June 5.
- 2007b. Completion of Mitigation Implementation for Impacts to Diegan Coastal Sage Scrub, Valley Needlegrass, and Thread-leaved Brodiaea Habitat and Southern Willow Scrub Wetland on the Fox-Miller Property (RECON Number 3028-2B). December 12.
2005. Final Habitat Restoration and Mitigation Plan for Diegan Coastal Sage Scrub, Valley Needlegrass, with Thread-leaved Brodiaea, and Southern Willow Scrub Wetland for the Fox Property, Carlsbad, California. 39 pp. November 23.
- U.S. Fish and Wildlife Service. 2005. Species Information: Threatened and Endangered Animals and Plants. URL: <http://www.fws.gov/endangered/wildlife.html>.

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Appendix A

REPRESENTATIVE PHOTOGRAPHS





Photo Point 1– southern willow scrub restoration area, looking east.



Photo Point 2 – northern Diegan coastal sage scrub restoration slope, looking north/northeast.



Photo Point 3 – eastern Diegan coastal sage scrub restoration slope, looking south



Photo Point 4 – southern Diegan coastal sage scrub restoration slope, looking south



Photo Point 5 - native grassland restoration area, looking northwest



Photo Point 6 - eastern portion of native grassland restoration area, looking northeast to northwest.



Transect 1 - looking southeast



Transect 2 - looking northwest

J/PROJECTS/Biology/M/MWR-03 Salk (Year 4)/Report/Yr4 ann rpt Site Photos

Representative Photographs

2010 ANNUAL ASSESSMENT FOR LOT 5 FOX-MILLER PROPERTY

Appendix A



Transect 3 - looking southwest



Transect 4 - looking northwest

J/PROJECTS/Biology/M/MWR-03 Salk (Year 4)/Report/Yr4 ann rpt Site Photos

Representative Photographs

2010 ANNUAL ASSESSMENT FOR LOT 5 FOX-MILLER PROPERTY

Appendix A



Transect 5 - looking northwest



Transect 6 - looking southeast



Transect 7 - looking northeast



Transect 8 - looking southwest



Transect 9 - looking northeast



Transect 10 - looking northwest



Transect 11 - looking northwest



Transect 12 - looking northwest



Transect 13 - looking northwest

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Appendix B

PLANT SPECIES OBSERVED



Appendix B
PLANT SPECIES OBSERVED – LOT 5 FOX-MILLER PROPERTY

NATIVE GRASSLAND

<u>Scientific Name</u>	<u>Common Name</u>
<i>Anagallis arvensis</i> *	scarlet pimpernel
<i>Avena fatua</i> *	wild oats
<i>Bloomeria crocea</i>	common goldenstar
<i>Brachypodium distachyon</i> *	false brome
<i>Brassica nigra</i> *	black mustard
<i>Bromus diandrus</i> *	ripgut brome
<i>Brodiaea filifolia</i>	thread-leaved brodiaea
<i>Bromus hordeaceus</i> *	soft chess
<i>Bromus madritensis</i> ssp. <i>rubens</i> *	red brome
<i>Calystegia macrostegia</i>	morning glory
<i>Centaurea melitensis</i> *	star thistle
<i>Convolvulus simulans</i>	small flower morning glory
<i>Cynara cardunculus</i> *	artichoke thistle
<i>Deinandra fasciculata</i>	fascicled tarweed
<i>Diclostema capitatum</i>	bluedicks
<i>Foeniculum vulgare</i> *	fennel
<i>Hedypnois cretica</i> *	crete weed
<i>Lactuca sericia</i> *	wild lettuce
<i>Lolium multiflorum</i> *	Italian rye grass
<i>Nassella pulchra</i>	purple needlegrass
<i>Picris echoides</i> *	bristly ox-tounge
<i>Sisyrinchium bellum</i>	blue eyed grass
<i>Sonchus oleraceus</i> *	sow thistle

DIEGAN COASTAL SAGE SCRUB

<u>Scientific Name</u>	<u>Common Name</u>
<i>Adolphia californica</i>	California adolphia
<i>Anagallis arvensis</i> *	scarlet pimpernel
<i>Artemisia californica</i>	California sagebrush
<i>Avena fatua</i> *	wild oats
<i>Baccharis pilularis</i>	coyote bush
<i>Baccharis sarothroides</i>	broom baccharis
<i>Bloomeria crocea</i>	common goldenstar
<i>Brachypodium distachyon</i> *	false brome

Appendix B (cont.)
PLANT SPECIES OBSERVED – LOT 5 FOX-MILLER PROPERTY

DIEGAN COASTAL SAGE SCRUB (cont.)

<u>Scientific Name</u>	<u>Common Name</u>
<i>Brassica nigra</i> *	black mustard
<i>Bromus diandrus</i> *	ripgut brome
<i>Bromus hordeaceus</i> *	soft chess
<i>Bromus madritensis</i> ssp. <i>rubens</i> *	red brome
<i>Calystegia macrostegia</i>	morning glory
<i>Centaurea melitensis</i> *	star thistle
<i>Conyza</i> sp.*	horseweed
<i>Diclostema capitatum</i>	bluedicks
<i>Encelia californica</i>	California encelia
<i>Erodium</i> sp.*	birds beak
<i>Foeniculum vulgare</i> *	fennel
<i>Gnaphalium</i> sp.	cudweed
<i>Hazardia squarrosa</i>	saw toothed Goldenbush
<i>Hedypnois cretica</i> *	crete hedypnois
<i>Heteromeles arbutifolia</i>	toyon
<i>Hesperoyucca whipplei</i>	chaparral yucca
<i>Isomeris arborea</i>	bladderpod
<i>Leymus condensatus</i>	giant rye grass
<i>Lolium multiflorum</i> *	Italian rye grass
<i>Malosma laurina</i>	laurel sumac
<i>Mirabilis jalapa</i> *	wishbone bush
<i>Nassella pulchra</i>	purple needlegrass
<i>Opuntia littoralis</i>	coast prickly pear
<i>Phalaris</i> sp.*	canarygrass
<i>Picris echoides</i> *	bristly ox-tounge
<i>Polypogon monspeliensis</i> *	rabbitsfoot grass
<i>Rhus integrifolia</i>	lemonade berry
<i>Salix lasiolepis</i>	arroyo willow
<i>Salvia mellifera</i>	black sage
<i>Sambucus mexicana</i>	Mexican elderberry
<i>Schismus barbatus</i> *	Mediterranean grass
<i>Sisyrinchium bellum</i>	blue eyed grass
<i>Solanum</i> sp.	nightshade
<i>Sonchus oleraceus</i> *	sow thistle
<i>Vitis californica</i>	wild grape

Appendix B (cont.)
PLANT SPECIES OBSERVED – LOT 5 FOX-MILLER PROPERTY

SOUTHERN WILLOW SCRUB

<u>Scientific Name</u>	<u>Common Name</u>
<i>Baccharis pilularis</i>	coyote bush
<i>Baccharis salicifolia</i>	mule fat
<i>Distichlis spicata</i>	salt grass
<i>Iva hayesiana</i>	San Diego marsh elder
<i>Juncus acutus</i>	spiny rush
<i>Leymus condensatus</i>	giant wildrye
<i>Leymus triticoides</i>	creeping wild rye
<i>Pluchea odorata</i>	marsh fleabane
<i>Polypogon monspeliensis</i> *	rabbitsfoot grass
<i>Platanus racemosa</i>	Western sycamore
<i>Salix exigua</i>	sandbar willow
<i>Salix gooddingii</i>	black willow
<i>Salix lasiolepis</i>	arroyo willow
<i>Scirpus meritimus</i>	prairie rush
<i>Typha</i> sp.	cattails

*Non-native species

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Appendix C

ANIMAL SPECIES OBSERVED WITHIN THE VARIOUS RESTORATION AREAS



Appendix C
ANIMAL SPECIES OBSERVED WITHIN THE VARIOUS RESTORATION AREAS
LOT 5 FOX-MILLER PROPERTY

<u>Scientific Name</u>	<u>Common Name</u>	<u>Vegetation Community*</u>
VERTEBRATES		
<u>Birds</u>		
<i>Ardea alba</i>	great egret	NG
<i>Buteo jamaicensis</i>	Red-tailed hawk	DCSS, NG, SWS
<i>Calypte anna</i>	Anna's hummingbird	DCSS, NG, SWS
<i>Carduelis psaltria</i>	lesser goldfinch	DCSS, NG, SWS
<i>Carpodacus mexicanus</i>	house finch	DCSS, NG, SWS
<i>Chamaea fasciata</i>	wrentit	DCSS
<i>Charadrius vociferus</i>	killdeer	NG
<i>Circus cyaneus</i>	Northern harrier	DCSS, NG
<i>Corvus corax</i>	common raven	DCSS, NG, SWS
<i>Dendroica coronata</i>	yellow-rumped warbler	DCSS, SWS
<i>Hirundo pyrrhonota</i>	cliff swallow	NG
<i>Melospiza melodia</i>	song sparrow	DCSS, NG, SWS
<i>Mimus polyglottos</i>	Northern mockingbird	NG
<i>Pipilo crissalis</i>	California towhee	DCSS, SWS
<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher	DCSS, SWS
<i>Psaltiriparus minimus</i>	Bushtit	DCSS
<i>Sayornis nigricans</i>	black phoebe	NG
<i>Sayornis saya</i>	Say's phoebe	NG
<i>Thryomanes bewickii</i>	Bewick's Wren	DCSS
<i>Tyrannus vociferans</i>	Cassin's kingbird	NG
<i>Zenaida macroura</i>	mourning dove	NG
<i>Zonotrichia leucophrys</i>	white-crowned sparrow	DCSS, SWS
	NOMO – NG	
<u>Reptile</u>		
<i>Crotalus viridis</i>	Southern Pacific Rattlesnake	NG
<u>Mammals</u>		
<i>Procyon lotor</i>	racoon	SWS
<i>Thomomys bottae</i>	Botta's pocket gopher	DCSS, NG

*DCSS = Diegan coastal sage scrub, NG = native grassland, and SWS = southern willow scrub

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